



# VIT

Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act, 1956)

## SCHOOL OF ADVANCED SCIENCES CONTINUOUS ASSESSMENT TEST - I WINTER SEMESTER 2024-2025

REG.NO.. 2422101

SLOT: E1+TE1

**Programme Name & Branch** : B. Tech.  
**Course Code and Course Name** : BMAT101L & CALCULUS  
**Faculty Name(s)** : Dr. SHOBANA DEVI N, Dr. GARGI CHAKRABORTY,  
 Dr. PERI KAMESWARA KAMESWARAN  
**Class Number(s)** : VL2024250501212, 6584, 1213  
**Date of Examination** : 20-03-2025  
**Exam Duration** : 90 minutes **Maximum Marks: 50**

**Answer All Questions**

**General instruction(s):** Open Text Book / Open Note Book mode

- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes  
**CO2-** Evaluate partial derivatives, limits, total differentials, Jacobians, Taylor series and optimization problems involving several variables with or without constraints.  
**CO3-** Evaluate multiple integrals in Cartesian, Polar, Cylindrical and Spherical coordinates.

Q. No	Question	M	CO	BL
1.	If $u = x + y + z, v = x^2 + y^2 + z^2, w = x^3 + y^3 + z^3 - 3xyz$ , then find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$ Are $u, v$ and $w$ functionally related? If so find the relationship.	10	2	2
2.	Expand $f(x, y) = \frac{y^2}{x^3}$ in powers of $(x-1)$ and $(y+1)$ up to second degree terms.	10	2	2
3.	Find a point in the plane $x + 2y + 3z = 13$ nearest to the point $(1, 1, 1)$ by method of Lagrange's multipliers.	10	2	2
4.	Change the order of integration and hence evaluate $\int_0^{\sqrt{x}} \int_{\frac{x}{2}}^{\frac{x}{2}} (x^2 + y^2) dx dy$	10	3	3
5.	Using cylindrical co-ordinates evaluate $\iiint (x^2 + y^2) dx dy dz$ , taken over the volume bounded by the $xy$ -plane and the paraboloid $z = 4 - x^2 - y^2$ .	10	3	3